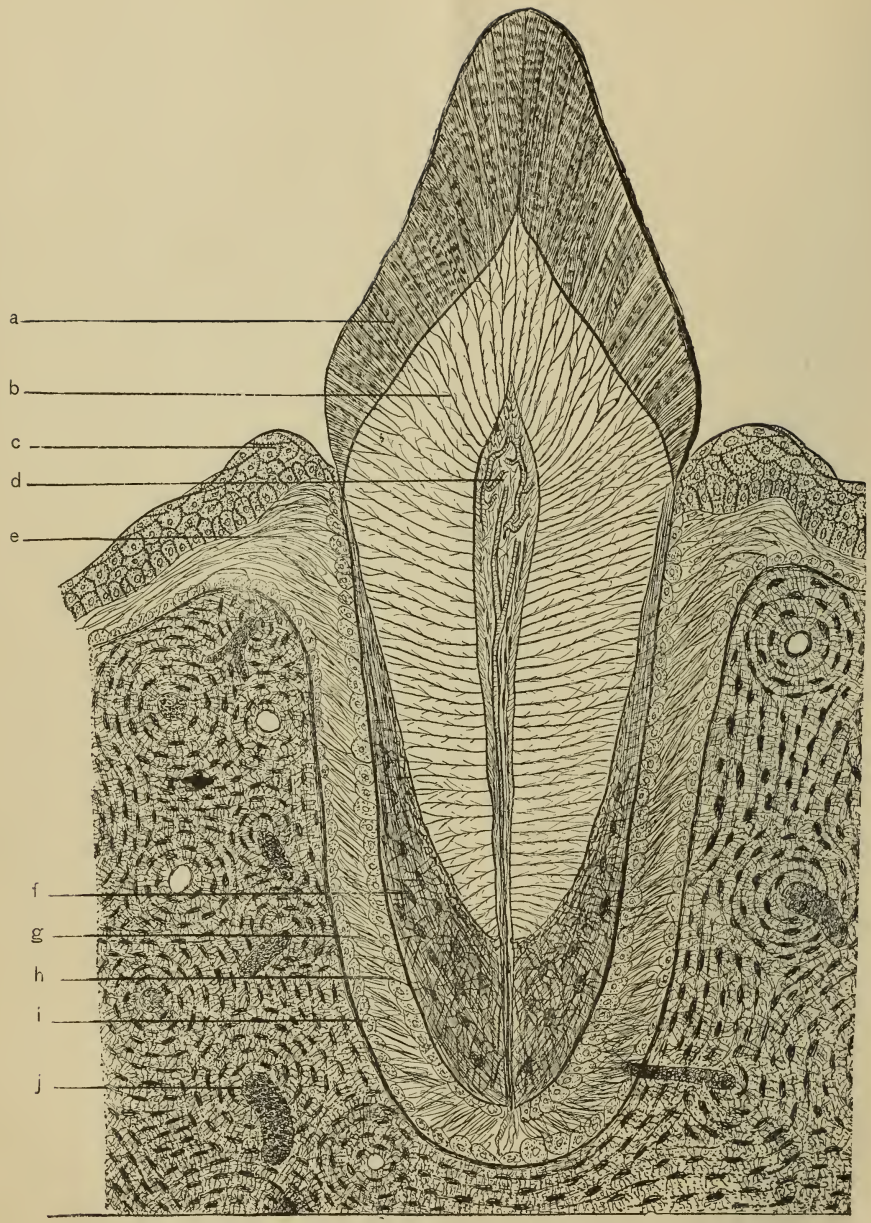
A NEW SYSTEM

OF

PROSTHETIC DENTISTRY.

SHEFFIELD.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In presenting the profession with what we believe to be the most important and valuable system of prosthetic dentistry which has ever been invented, we desire to call your attention to the fact that observant and thinking dentists are everywhere slowly awakening to the lamentable truth that the cheaper forms of artificial dentures have proved much more of a curse than a blessing. The introduction, therefore, of any improvements which will tend to elevate the standard of dentistry, by securing to the patient a form of denture which shall be more compatible with nature's laws, and to the dentist a more equitable compensation for his services, ought to be hailed with enthusiasm.

The true purpose of the conscientious dentist should be the exercise of his best efforts for the conservation of those conditions in the mouth which are in harmony with those laws which govern the organism as a unity.

The preservation of the natural teeth, or the supplying of something which shall closely approximate that condition of the mouth which we find when there are healthy, well preserved teeth, is the one thing in dentistry to be desired above all others, and it is at the same time a condition from which the modern practice of dentistry seems to be farther and farther departing.

The result of this degeneracy has been alike disastrous to dentist and patient. It needs no argument to prove that dentists are the hardest worked and poorest paid professional men in existence, and this is largely due to the degradation of the prosthetic element in their work.

The introduction of rubber and celluloid as bases upon which to mount artificial teeth, was the inauguration of an era which has been prolific of evils that may not be remedied in one generation.

The one fact that these substances are poor conductors of thermal change is alone sufficient for their condemnation. A higher temperature will always be found beneath these plates than when the mouth is in its normally exposed condition. The dilatation and contraction of the blood-vessels by which the proper flow of blood is regulated, and the cooling of blood by contact with the air (conditions which are absolutely necessary to a healthy condition of the mouth), is quite impossible beneath these plates.

The very condition which is essential to the retention of these plates, exclusion of air by suction, is the one which produces the most injury. *Extravasation of blood can be produced* by the suction of the mouth, if the lips be applied to any tender, unexposed surface of the body. Is it surprising, then, that the continued sucking required to hold most plates to the roof of the mouth should cause congestion? That this suction does produce a hypertrophied condition of the mucous membrane may be proved by an examination of almost any mouth where one of these plates has been inserted for any length of time. A pathological condition of the mouth is a necessary concomitant condition of an artificial denture upon a vegetable base plate. Rapid absorption of the alveolar process and bone follows the congested condition of the mucous membrane and consequent paralysis of nervous supply. The mucus assumes an acid reaction, and where natural teeth are present, they soon become sensitive and unhealthy about the necks, and, notwithstanding the utmost care, the surrounding gums lose their integrity, a deposit of tartar is induced and gradually the teeth loosen, and finally, if not extracted as a relief from their annoyance, they drop from their sockets.

While it is true that in many cases these evil effects are not present in an aggravated form, on the other hand, in many instances there is necrosis of the bone with sloughing of the tissues. We feel certain that we express the opinion of a large majority of the better class of practitioners when we say that rubber and celluloid are unworthy of use by a profession which asks to be recognized as a specialty of medicine. Everywhere the intelligent and progressive men of the dental profession are expressing their disapprobation of the present methods of restoring lost teeth, and asking for something better. After many months' careful experiment in and out of the mouth, and at a cost of thousands of dollars, we have perfected a system for restoring lost and badly decayed teeth, which we are confident the dental profession will accept as being immeasurably superior to anything heretofore offered for that purpose. We believe that it brings within the

reach of the dentist of average ability, the possibility of producing within any mouth in which there remain so few as even four or five firm roots, a condition very closely approximating that presented when the mouth is in a healthy condition. As, in the application of this work, it sometimes becomes necessary to make use of teeth the pulps of which are still living, and as the surgical removal of the pulp must necessarily precede such application, we desire before proceeding to a detailed description of the mechanical and prosthetic features of our work, to call your attention to the microscopical anatomy of the root of a tooth and its surrounding tissues, and their relations to each other as seen in the light of recent histologic investigations. It has, until quite recently, been supposed that the pulp of a tooth was, at least so far as the dentine and enamel were concerned, the essential nutrient organ. But we propose to demonstrate, by the aid of illustrations drawn from actual specimens under the microscope, that the entire root of a tooth may still be regarded as living tissue after the removal of the pulp. We do not wish to be understood as implying that the vital conditions are as perfect in the root of a pulpless tooth as when in its normal condition, but that it has sufficient vitality to maintain it through life in a condition of comparative health *if properly treated.* A little study of the different phases through which the pulp passes in the development of a tooth, and the character of the tissue of a fully developed normal pulp, will convince any thoughtful, reflecting mind that the office of this organ is largely *formative.* In the developing tooth the pulp is very broad at its base and of a papilliform or cone shape. As a formative organ it demands a large supply of blood, and broad connection and relation with the dermal tissues, from whence it receives its nutrient supply. But after the formation of the *crown* of the tooth, which seems to be the special office of the pulp, a constriction is observed about its base. The continued process of development forces the crown upward, the pulp continues to decrease in size and elongate at its lower extremity, and from this lower elongated part the dentine of the root is developed, and upon it the periosteum, or pericementum, develops the cementum. The constriction about the lower extremity of the pulp continues to increase until, in the fully developed tooth, that portion which enters the root of the tooth is, in many instances, a delicate thread, the size of which hardly exceeds that of a hair. This, of course, indicates a gradually decreasing demand for its use. In the calcification of the pulp, or the formation of secondary dentine within the pulp cavity, the tooth usually presents no appearance which indicates that it does not retain its normal vitality, at least, so far

as its relations to the surrounding tissues or resistance to decay is concerned. It is also usually quite sensitive.

All this being true, what evidence is there showing that the pulp may not be removed, if done instantly by a mechanical or surgical process, and without the intervention of any penetrating destructive medicinal agent, and the root of the tooth still be maintained in a living, vital condition ? Let us see what arguments and facts may be presented from analogy, from a study of the microscopic structure of the tooth, and from observation and experience.

In the formation of the enamel we have an illustration of the formation of a tissue by a process entirely different and remote from that which is afterwards brought into action for supplying it with nutrient matter for the continued preservation of its integrity.

The enamel organ is developed from the epithelium. The ameloblasts, or enamel cells, are formed from the layer of columnar epithelial cells. The cuboidal epithelial cells which fill the space of the interior of the enamel organ, develop into a secreting organ which extracts from the blood, which is supplied by an intricate plexus of capillaries developed around the exterior of this organ, the material necessary for the building up of the enamel. But with the completion of the development of the enamel, the office of the enamel organ ceases, and it disappears.

But the framework of living matter into or upon which the calciferous material is deposited, has become continuous with the living matter of the dentine, and this bond of union becomes the new source through which the material is supplied for maintaining the continued integrity of the enamel. In the change which occurs in the circulation of a child at the moment of birth we have another illustration of the wonderful manner in which nature changes her method of supplying the necessary conditions of life. But as it may be objected that this change comes within the limits of normal life, we will not urge the point, but will call your attention to some of the wonderful ways in which nature provides for accidental emergencies in the economy of the human organism. It is an erroneous notion to suppose that blood in the interior of a tooth is *necessary* to the continued life of the dentine. For proof of this I need only to refer you to the commencement and advance in the growth of many organs in the embryo *before* the formation of blood-vessels *in* those parts. In fact, the formation of vessels seems to be a secondary matter.

"The first perfection of the economy of the human body is in the exactitude with which its several parts are balanced in their

powers ; and the mutual adaptation thus established is continued, in ordinary life, by the nutrition of each part being regulated according to a law of direct proportion to the quantity of work that each discharges. *But* when the external conditions of life vary, and require for the maintenance of health varying amounts of function to be discharged by one or more parts, and, still more, when disease disturbs the functional relations of any part to the rest, then each part displays a capacity of adaptation to the new conditions in which it is placed."

You will bear with us if we dwell at considerable length upon these points, for we wish to place our argument in the strongest possible light, because the thoughts and reasonings which we are presenting for your consideration are not only new but opposed to the established time-honored teachings of our profession.

The change of condition which is necessary to the continuance of a certain degree of life in the root of a tooth after the destruction of the pulp, is not a phenomenon which need excite our credulity when we take into consideration the microscopic construction of the parts, and the many wonderful exhibitions of the powers of certain organisms to restore and repair lost or injured parts.

In the different forms of Hydra it seems literally true that any minute portion which may be taken from the germ mass, may, after separation from the perfect body, reproduce or develop into a new perfect form. Very many of the low forms of life possess this remarkable power of developing perfect individual forms from detached parts of the parent mass. In the insects and some of the higher forms of animal life we have numerous examples of the reparative power as shown in the reproduction of lost organs or members ; such as legs, claws, a part of the body, the head, an eye, the tail and the like.

Surgery furnishes an almost innumerable number of examples of the changes which are effected for the continued nutrition of a part after ligation of large and important blood-vessels.

We know of no stronger evidence of divine design in the construction of the human body than this capacity for action in events which are not only in the future but may never occur.

Indeed the probabilities of their occurrence are so low that should they ever happen they would be called accidents ; and yet nature, or some power superior to nature, has provided for these possibilities. Having shown you something of this power on the part of the organism for adapting itself to changed conditions which are the results of mechanical injuries, let us study a little the microscopic structure of the parts which we are considering ; in which study we shall find sufficient evidence to warrant our claim

that it is, at least, among the rational probabilities. Every practising dentist has observed that a tooth which is removed from contact with the fluids of the mouth changes color. This change

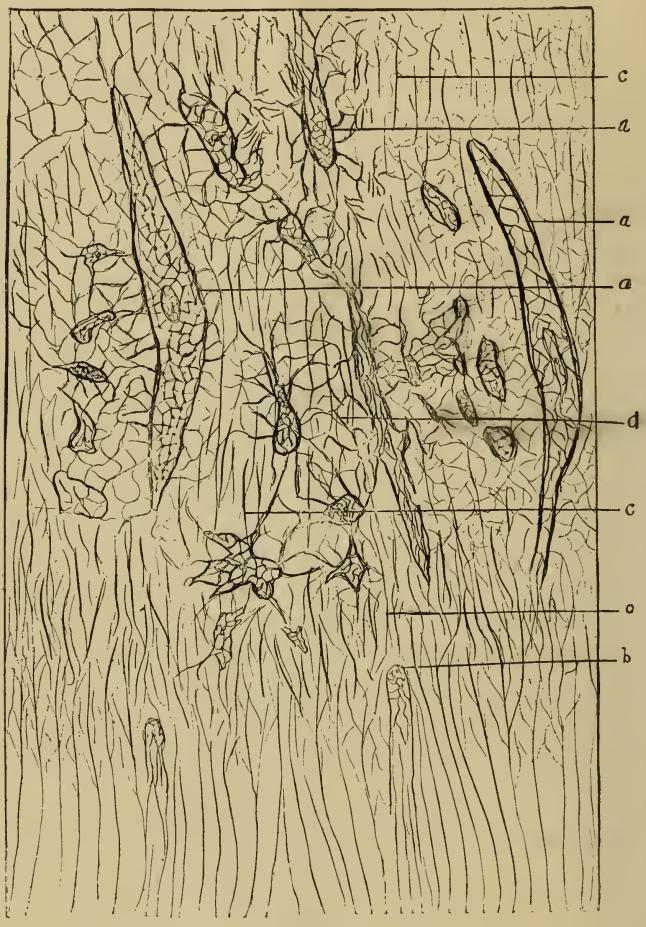

FIG. 1.

DRAWN FROM MICROSCOPIC SPECIMEN OF ROOT OF TOOTH, SHOWING TRANSITION OF DENTINE INTO CEMENTUM.

a, cement corpuscles, showing reticulum or network of living matter.
b, border of dentine, showing peculiar anastomosis of dentinal fibrillæ.
c, dental fibrillæ which reappear everywhere throughout the cementum.
d, anastomosis of cement corpuscles, × 350 diameters.

in color is largely the result of the evaporation of the water from the organic portion of the tooth. Now if the apical foramen of such a tooth be closed, and the tooth be then placed in water, or

preferably, glycerine and water, in a short time it will regain nearly its original color, and at the same time it will be found that it has increased in weight. This means, of course, that the entire tooth has absorbed, *from the surface*, a certain quantity of the fluid, and this fluid has penetrated *every part* of the solid structure of the tooth. Will any one doubt, with these facts in view, that when the tooth is in position in the jaw, and surrounded by all the delicate adjustments furnished by nature, there may not be a circulation of nutrient fluids throughout the entire root of the tooth after the removal of the pulp ? The removal of the pulp, when effected by a purely mechanical or surgical process, leaves the delicate fibrillæ, which everywhere penetrate the dental canaliculi, in a healthy condition.

Something analogous to a healing process may then take place on the surface of the ends of these broken fibrillæ. Let us now study our drawings from microscopic sections of these parts, and we shall readily see how the life and health of the dentine and cementum may be maintained.

Fig. 1 was drawn from a microscopical specimen of the root of a tooth and shows the transition of dentine into cementum ; I say transition, because there is no well-defined line of demarkation between the two tissues. It is impossible to say just where dentine ends and cementum begins.

We have many specimens in which the dentinal fibrillæ may be traced into and nearly or quite through the cementum, and everywhere these fibrillæ are seen to be in direct connection with the bioplasson bodies, or cells containing living matter, which are distributed throughout the cementum. We particularly desire to call your attention to *the continuity of living matter* in dentine and cementum as shown in this drawing.

Dr. Bödecker, in his description of cementum, says :

"Within the basis substance of the cementum there are numerous branching spaces in correspondence with the lacunæ of bone."

"No essential difference is noticeable between the lacunæ and canaliculi of ordinary bone and those of cementum : in both tissues there exists a great variety as to the general arrangement, the size of the lacunæ, and the number and ramifications of their offshoots. The walls of the lacunæ and the coarser offshoots, if viewed with a highly magnifying lens, appear interrupted at their peripheries by light spaces, which lead into a light, delicate network, piercing the whole basis substance to such an extent that only the meshes have to be considered as the fields of calciful basis substance.

"Each lacunæ contains a plastid or cell, with a central nucleus—

the cement corpuscle. The nucleus sometimes is relatively large and surrounded only by a narrow seam of bioplasson, while in some small lacunæ, a body of the appearance of a nucleus is present without a noticeable amount of surrounding bioplasson. The net-like structure of the plastids is plainly visible on all cement corpuscles."

"Cement corpuscles are usually round or spindle-shaped bodies but are sometimes very irregular. In teeth of juvenile and middle-aged persons we meet with cement corpuscles, surpassing three or four times the size of ordinary ones, in which two or three nuclei are visible. In some teeth, broad, spindle-shaped spaces pierce the cementum in a radiated direction, all of which contain bioplasson with delicate offshoots.

"Sometimes medullary spaces traverse the lamellæ in different directions, which, besides a varying number of medullary elements, contain capillary blood-vessels, evidently in connection with the capillaries of the pericementum. All of these bodies of living matter within the cementum, though varying greatly in shape, agree in being connected with each other by the delicate net-work which everywhere pierces the basis substance. At the periphery of the cementum on the line of the connection with the pericementum, the net-work of bioplasson is usually very broad and the fields of basis substance show a prevailing globular appearance. Also numerous spindle-shaped plastids are seen in connection with the cementum in an oblique arrangement forming the transition into the structure of the pericementum." The connection between dentine and cementum is established either by a gradual change of one tissue into the other, or there may exist a more or less distinctly marked boundary line.

In either case, *the living matter in these tissues always* passes from one to the other without break of its continuity and may even be traced through the pericementum and into the bony tissue of the jaw.

Fig. 2 shows the relation of the root of a tooth to the surrounding osseous structure, with the intervening pericementum. The drawing was made under a much lower magnifying power than Fig. 1, and the intimate relations of the exceedingly delicate fibres or threads of living matter are not as plainly shown.

At the upper part of the figure is seen the Haversian and lamellated systems of bone. The bone corpuscles everywhere show their branching and connection with each other, and at the border of the bone next the pericementum, these offshoots of the bone cells are seen to be in direct relation with delicate threads of living matter which run out from the pericementum. These same

minute threads are also seen on the opposite side of the pericementum in connection with the cement corpuscles, and everywhere the cement corpuscles are seen to be connected with each other and to the termination of the dentinal fibres by this delicate net-work. The minute dots of the so-called granular layer are probably the fine branching terminations of the dentinal fibrillæ cut

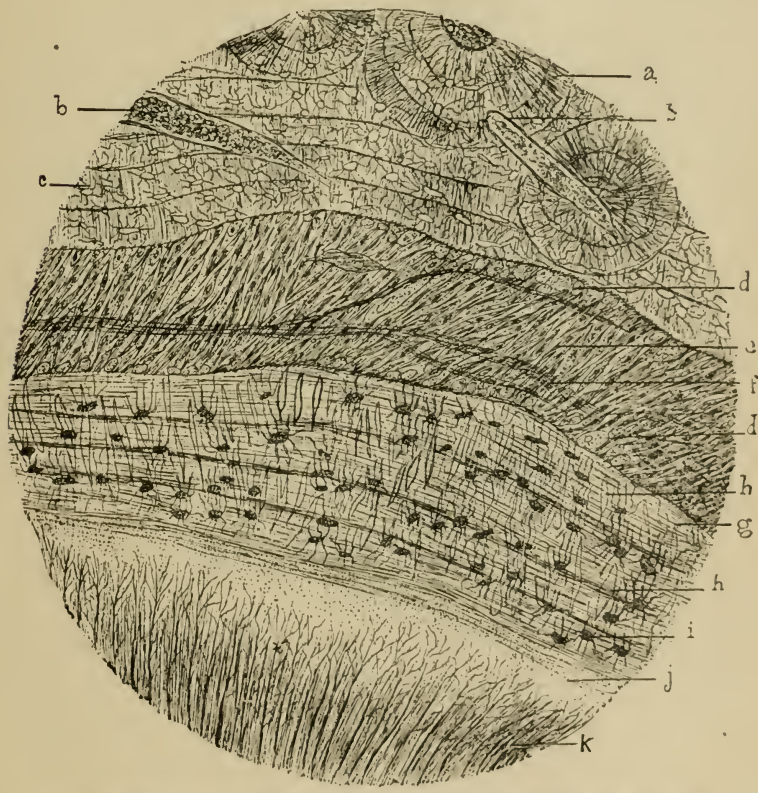

FIG. 2. FROM A SECTION THROUGH ROOT OF TOOTH, PERICEMENTUM AND BONE.

a Haversian system in bone of inferior maxilla.
bb Medullary canals filled with medullary elements.
c Lamellated structure of bone.
dd Pericementum, showing layers of medullary corpuscles next to the bone and cementum.
e Pericementum, showing spindle-shaped cells.
f Blood-vessel.
g Cementum.
h Spindle-shaped bodies of living cementum.
i Cement corpuscles.
j So called granular layer between dentine and cementum.
k Dentine, showing dentinal fibrillæ.

transversely. The one important point which we have sought to make clear is the intimate relation of the root of the tooth, through its net-work of living matter, with the surrounding structures.

These facts inevitably force us to the conclusion that a sufficient degree of vitality may be maintained in the dentine, as well as in the cementum of the root of a tooth by its connection with the pericementum, to maintain the root in a comparatively healthy condition. Of course, this desirable condition cannot exist in cases where arsenic or powerful penetrating destructive medicinal agents have been applied for the devitalization of the pulp, for they penetrate the root, destroying, to a greater or less extent, its net-work of living matter.

But even in cases where the pulp has long been destroyed, having been devitalized by an arsenical preparation, or having died from the constant irritation following exposure caused by the decay of the tooth, there is a certain amount of vitality maintained in the root; sufficient, if it be properly treated, to make it a safe and serviceable foundation for an artificial crown, which may prove even more durable than the original natural tooth, while it at the same time performs *every office* of its natural predecessor. We have, during the past year, mounted more than ten thousand artificial crowns upon single roots and bridges; and although, in a large proportion of cases presented for treatment, the roots are diseased to a greater or less extent, yet the per cent. of failures is probably far less than can be shown by the records of any institution in the world devoted to the practice of general dentistry.

Our first and most important principle of procedure is to see that the parts to be operated upon are in a healthy condition. If there is tartar about the necks of the teeth or roots, beneath the gums, *remove it thoroughly.* If there has been alveolar abscess, and a fistulous opening remains, *cure it.* If there is pyorrhea alveolaris, or so-called Riggs' disease, from whatever cause, *the parts should be put in a healthy condition.* This can be accomplished in, at least, ninety-nine cases in every hundred, as we are daily demonstrating in our practice. We are probably speaking considerably within bounds when we say that we have successfully treated during the past year more cases of alveolar abscess and Riggs' disease than any dental or medical institution in this country. The advantages in this direction alone to those who come to learn our methods of work are of almost incalculable value. Having now shown the necessity for some more rational system of restoring lost or badly decayed teeth, and the possibility of the roots of pulpless teeth being retained in the alveolar sockets in a healthy living condition, we desire to call your attention to our system of operating in detail. The ultimate success of this operation depends upon the care and skill bestowed upon the detail of

the work ; and this can best be acquired by watching the various steps as followed or conducted by a skilled operator.

1 and A, in Fig. III., represent the root of a right superior lateral to which we wish to attach a porcelain-faced crown, with solid gold backing. The root is first ground with corundum disks, or stones, giving it a beveled inclination, as shown at 2, Fig. I, until the front of the bevel is ground nearly or quite level with the margin of the gum. The inside of the root is next prepared by first enlarging the pulp canal with a drill, made for that purpose. After the enlarged canal has been thoroughly cleaned, it is plugged with a piece of red cedar which has been properly pointed and dipped in a mixture of glycerine and carbolic acid.

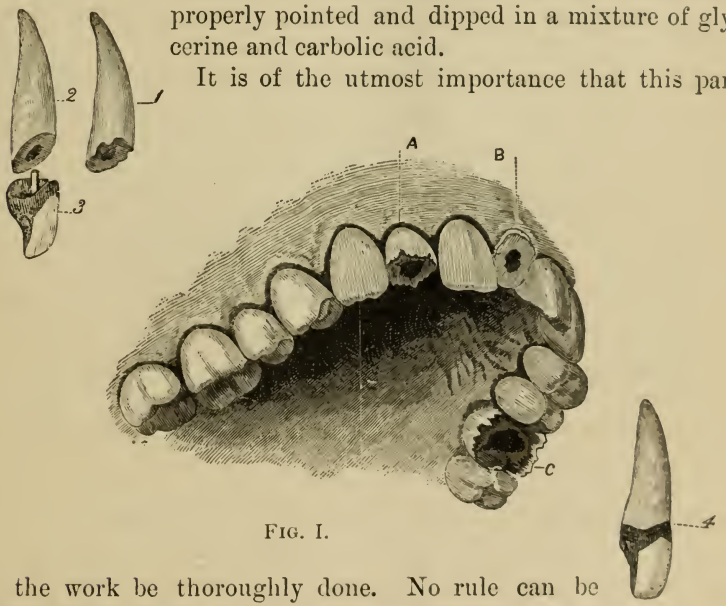

Fig. I.

It is of the utmost importance that this part of the work be thoroughly done. No rule can be given which may apply in all cases, but in a large majority of instances it is by far the better practice to cleanse and plug the root at once. Alveolar abscess, or severe pericementitis, can be easily, rapidly, and permanently cured by true surgical treatment. Any attempt to treat these difficulties through the pulp canal without a fistulous opening will generally result in an unsatisfactory manner.

Our extended experience has demonstrated the superiority of the above method for the permanent closing of the ends of root canals. If, after all possible care in the preparation and plugging of the root, pericementitis should follow and an abscess be threatened, the latter may be prevented and the former relieved at once and cured by passing a spear drill of the proper size through the alveolar process to the apex of the root. Relief will

follow readily in nearly every case, and the inflammation will rapidly subside.

After cutting off the wood plug at the open end of the root, the canal is still further enlarged for a suitable distance by drilling out the wood with a rose-bur of proper size for the reception of the metallic pin. With a pair of clasp-benders a gold band is next bent to fit the root. After soldering the band the upper part is ground or filed to correspond with the festooned margin of the alveolar process. Its upper part is also made very thin and smooth at the edge, so as to cause the least possible irritation to the gum. If the band is nicely fitted and adjusted, the irritation is so slight as to be scarcely noticeable, and passes completely away in two or three days. Two bevels are then ground upon the lower part of this band, from the front back and downwards, and from the back forward and downwards, meeting near the center. Upon these bevels, pieces of thin gold plate are soldered, trimmed smooth with the edge of the band, and a small hole cut through a little back of the centre for the reception of the pin. A tooth of the proper shape and shade is selected, and after backing, it is ground to place to fit the front bevel. The final fitting and adjusting having been completed in the mouth, the tooth and band are united by means of strong wax, removed from the mouth, the pin of square wire inserted in its proper place, and the whole invested for soldering. After removing the wax and drying, the tooth and cap are soldered, and afterwards ground and finished in imitation of the shape of the lingual surface of the tooth. After the work has been finally polished and is ready for insertion, the end of the root and the canal are made perfectly dry, a sufficient quantity of our cement, which is made for this purpose, is mixed to the consistency of thick cream. The root canal is filled with this cement, as is also the gold cap which fits over the end of the root. The crown is then forced into position by gentle pressure, where it is held until the cement hardens, the superfluous cement which has been forced out from beneath the band is removed, and the operation is completed. Variations from this method on account of peculiarities of conditions are constantly necessary; but the above is a careful description of the general method of procedure.

A and 1, in Fig. I., represents a decayed root of a lateral incisor.

B and 2 are roots properly beveled and prepared for a crown; 1 shows the crown ready for attachment; and 4 the same in position.

1, in Fig. I., illustrates a badly decayed molar, over which we wish to place an entire gold crown or cap after the Beers method.

2, Fig. II., represents a gold crown ready for attachment.

3, Fig. II., represents the gold crown in position on the root, and C its relation to the gum and contiguous teeth.

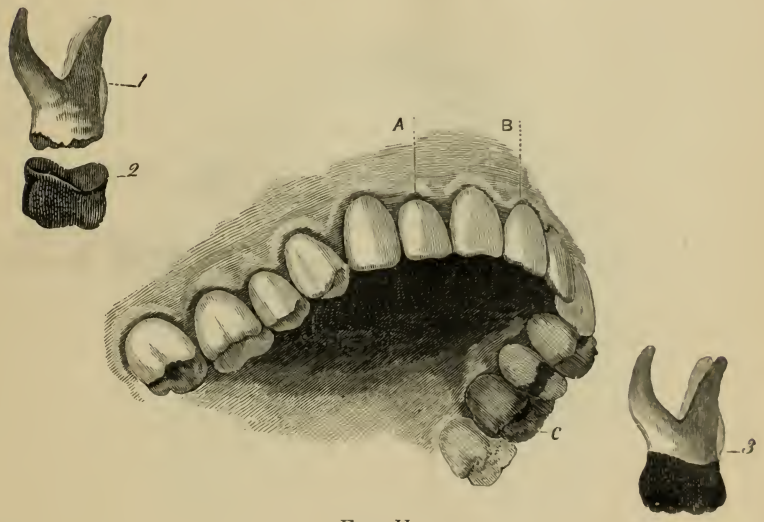

Fig. II.

If the pulp has been destroyed, the root canals are first carefully cleansed and plugged. If the pulp is still living, it is only necessary to remove the soft, superficial portion of decay, and saturate the cavity with a mixture of creosote and oil of cloves.

A gold band is then fitted around what remains of the tooth. It is soldered and ground until the gold top, with cusps, made either by soldering cusps to a piece of gold plate, or by striking a top between metallic dies, which have been made from patterns of natural or artificial teeth, is fitted so as to secure perfect articulation with the opposite jaw. The top is then soldered to place, the piece finished and polished, and a suitable quantity of cement placed in the crown, which is then pressed to place.

A and B, represent porcelain faced crowns in position in the mouth. We now come to the more extensive operations of crown-extension or bridge work.

Fig. III. was drawn from a model of a case in practice. In this case the roots of the centrals are shown prepared for the fitting of the bands, the laterals having been extracted. Single crowns are made for these roots precisely as above described. They are then temporarily placed in position. Laterals are selected, backed, ground and fitted to position. The laterals are then

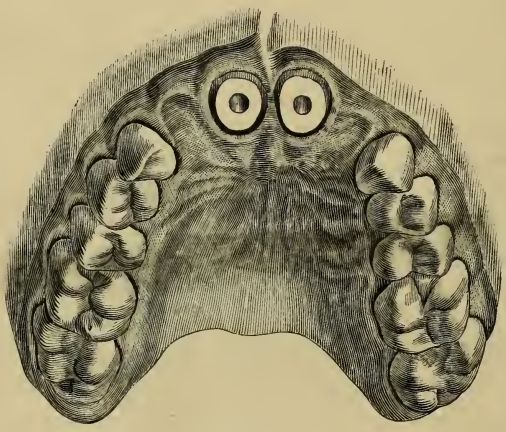

Fig. III.

attached by means of strong wax to the centrals, carefully adjusted in the position which we wish them to occupy, and the whole removed in an impression of investing material. An additional quantity of investment is mixed and poured over the exposed ends of the caps, and the whole allowed to harden, after which the investing material is cut away from the back of the teeth and crowns, and they are all united by soldering.

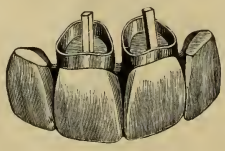

Fig. IV.

Fig. IV. shows the work completed, and Fig. V. is from a model of the mouth as restored by the crowns.

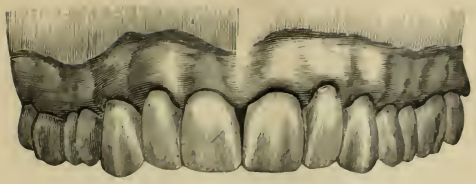

Fig. V.

In cases where the space is occasioned by the loss of more than one tooth a somewhat different method of procedure is necessary.

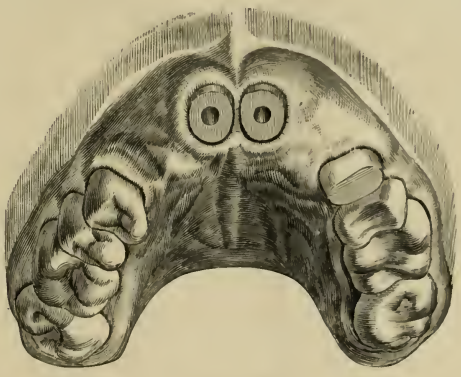

Fig. VI.

Fig. VI. shows a model of a mouth in which the superior laterals and canines had been extracted. The centrals were badly decayed, with exposure of the pulp; the first bicuspid on the left side badly decayed, but the pulp remaining intact. The first step is the removal of the pulp from the central roots. With a corundum disk a groove is cut transversely across what remains of the crown at or near the margin of the gums on both the labial and lingual surfaces. The blades of the excising forceps are placed in these grooves and the crown cut off. If the groove has been cut at the proper place the pulp will be exposed at its broadest diameter. The sudden shock caused by the removal of the crown produces a partial paralysis of the pulp, so that its removal may be effected with no pain, when it is large and easily accessible. A piece of orange wood, which has been previously pointed for the purpose, is driven with one blow of the mallet to the extremity of the root. The entire pulp will usually remain adherent to the stick on its removal, or if not, it can be easily drawn out with a barbed broach.

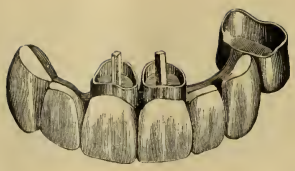

Fig. VII.

The entire operation will, if skilfully performed, cause far less pain than the preparation and filling of an ordinary cavity of decay. A drop of carbolic acid or a mixture of equal parts of carbolic acid and glycerine is introduced into the pulp canal and the red cedar point carefully driven to the extremity of the root. The projecting end of the wood is cut off and the canal enlarged for the reception of the metallic pin as before described. In our own practice less than one per cent. of the roots so treated give any further trouble. The crowns are then fitted as already described and placed in position. The cusps are removed from the bicuspid crown and the walls ground so that the broadest diameter of the tooth shall be at the margin of the gums, care being exercised not to expose the pulp. Over this stump a gold crown is fitted and placed in position. An impression is then taken in plaster, the crowns remaining imbedded on its removal. The impression is varnished and oiled, and a model of investing material poured. After this has hardened, the impression is carefully cut away, and we have a model of the mouth with the crowns in position. A "bite" is taken and the articulation secured in the usual manner. The remaining crowns having been backed, are fitted, and the face of the work imbedded in investing material. The whole piece is now united at the back by soldering, and when finished presents the appearance shown at Fig. VII.

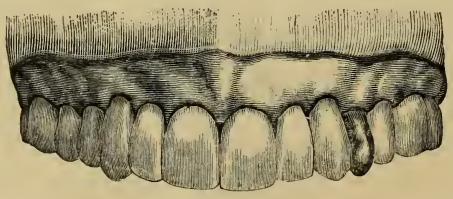

Fig. VIII.

Fig. VIII. shows a model of the mouth after the bridge has been cemented in place.

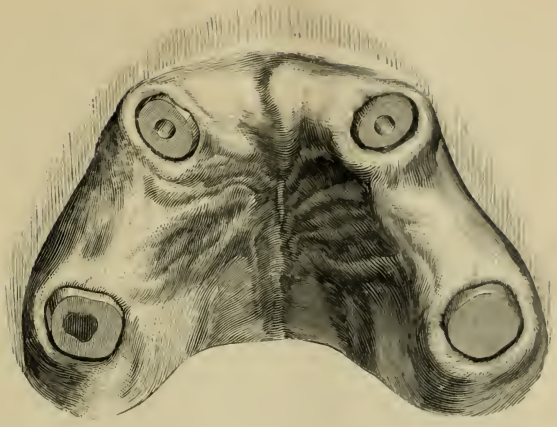

Fig. IX.

Fig. IX. is a model of a mouth in actual practice, in which only the roots of the second molars and canines remained.

Fig. X.

Fig. X. shows the piece which was constructed for this mouth, and

Fig. XI.

Fig. XI., the same in position.

We have many cases of this work, mounted on four and five roots, which are being worn with perfect satisfaction. The force required in mastication is so well equalized by the bridge uniting and holding all of the roots firmly in position that the strain upon any one of them is far less than would be supposed on a hasty examination.

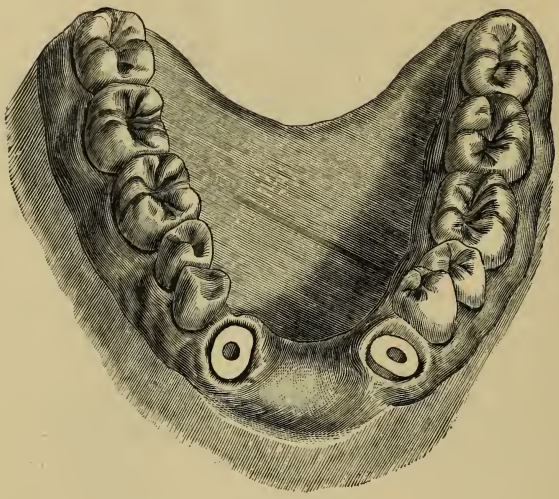

Fig. XII.

Fig. XII. is a model of a mouth in which the inferior centrals and laterals had been lost by an accumulation of tartar, and consequent loosening. Their loss was followed by considerable absorption of the alveolar process. This was remedied by constructing a piece, a labial and a lingual view of which is shown at Figs. XIII. and XIV.

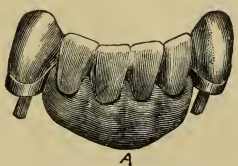

Fig. XIII.

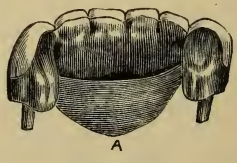

Fig. XIV.

Either rubber or celluloid may be used for the forming of the gums ; or the intervening teeth may be arranged as a piece of continous gum work, and afterwards backed and soldered to the crowns.

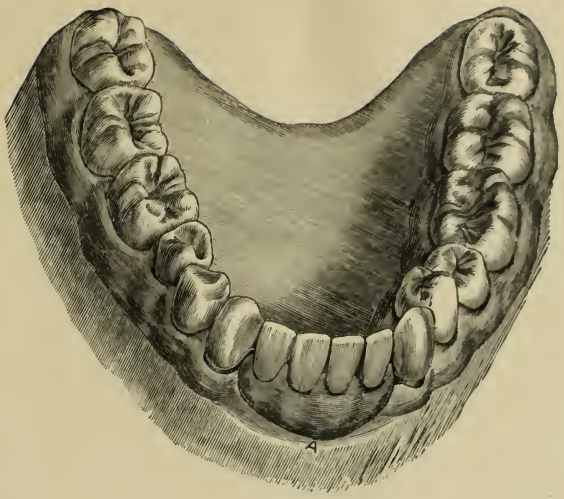

FIG. XV.

The above is a brief and somewhat imperfect presentation of the claims and possibilities of our new system of Tooth Crowning and Bridge Work. We believe that it fills a gap which has always existed between operative and mechanical dentistry. The vast amount of experience required to test the work under all possible circumstances and conditions has made a few failures inevitable. But notwithstanding the fact that this work has often been placed in mouths and upon roots which presented the most unfavorable conditions, we know that the per cent. of failures is far less than those occurring in the ordinary methods of practice. While it is not difficult to acquire the necessary skill to perform the operations in a creditable manner, yet the attainment of the greatest possible success demands the exercise of a high degree of manipulative skill, keen perception, and mature judgment.

There is no operation in the practice of the dentist which will bring more satisfactory results, both to patient and operator.